

## REMARKS/ARGUMENTS

This reply is responsive to an Office Action mailed on December 8, 2004. Claims 1-21 were pending in the application.

Independent claims 1 and 19 and dependent claims 2, 3 and 6 have been amended to clarify the language of the claims. The amendments to the claims were made to render them more clear and definite and to emphasize the patentable novelty thereof. There is no intention of surrendering equivalence.

New claims 22-39 have been added to emphasize the patentable novelty of the invention and are directed to an apparatus and method for high resolution imaging of a sample, and include cooling the cold finger and the radiation shield to two different temperatures.

Please note that all paragraph citations for the Applicants' specification for the above-identified application refer to the paragraphs numbers as published in U.S. Publication No. 2004/0145366A1 and not the paragraph numbers in the Applicants' originally filed application.

## PRIOR ART REFERENCES

The Office Action requires the Applicants to provide a copy of each of the art references/articles referred to in the disclosure from pages 1-4. An Information Disclosure Statement accompanies this Reply and Amendment to include copies of the readily available art references/articles. Some of these references/articles are not readily available. The Applicants are in the process of obtaining copies of the remaining references and anticipate providing copies of these references within the next few weeks.

## INFORMATION DISCLOSURE STATEMENT

An Information Disclosure Statement and Form 1449 accompany this Reply and Amendment for filing, containing reference to a U.S. patent disclosed in the Applicants' specification and a number of articles cited in the Applicants' disclosure from pages 1-4. These references/articles were not previously cited in any previously filed Information Disclosure Statement.

The Applicants will provide an additional Information Disclosure Statement and Form 1449 for the remaining references/articles cited in the Applicant's Disclosure from pages 1-4 when the remaining references/articles are located. It is anticipated this will be completed within a few weeks of this Reply and Amendment.

## ABSTRACT

The abstract of the disclosure has been objected to because line 1 contains words that are implied, namely "are disclosed." The abstract has been amended to remove the words, "are disclosed." The abstract is now in proper form and in compliance with MPEP 608.01(b).

## SPECIFICATION

The disclosure has been objected to because of a number of informalities. As such, the Applicants have amended paragraph [0103] to clarify that, "The instrument is magnetically shielded from environmental noise." The Applicants have also clarified the Brief Drawing Description for FIGS 2a and 2b by amending paragraphs [0057] and [0058].

Furthermore, the Applicants have amended paragraphs [0153], [0155], and [0156] to correct minor typographical errors regarding references to various figures. Lastly, the Applicants have amended paragraphs [0104] and [0108] to correct minor typographical errors. No new matter has been added as a result of these amendments to the specification.

## DRAWINGS

The drawings have been objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include reference signs mentioned in the description, namely the cold plate 52 and the motor 87.

Replacement sheets for Figure 1 and Figure 5 with an annotated sheet showing changes for these two figures have been provided. Figure 1 now shows the reference sign for the cold plate 52 and Figure 5 now shows the reference sign for the motor 87.

## CLAIM OBJECTIONS

Claim 6 has been objected to due to a lack of antecedent basis. Dependent claims 2, 3, and 6 have been amended to clarify the language of the claims and to provide antecedent basis for the term "thick backing window." Furthermore, claim 6 now properly depends from claim 2 instead of claim 1.

## CLAIM REJECTIONS – 103(b)

Claims 1-7, 11, 12, 17, and 19-21 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Wellstood, et al. (U.S. Pat. No. 5,894,220), hereinafter Wellstood I, in view of Wellstood, et al. (U.S. Pat. No. 6,516,281), hereinafter Wellstood II.

Wellstood I discloses a cryogenic device for microscopy which allows positioning of a sample for measurement outside of the vacuum space. The device incorporates a SQUID chip and a sensor sandwiched together. (See Col 4, line 12, Col 5, lines 56-67, and FIG. 4a.) The construction of the device provides for maintenance of the SQUID chip at 77 degrees K. (See Col 4, lines 30-33.)

The Applicants claim "a detection coil being electrically connected to the SQUID sensor." The Applicants' claimed approach includes "a mechanism for

mounting the detection coil at the distal end of the cold finger.” Moreover, there is claimed “means for mounting the sensor remotely from the coil.”

Instead, Wellstood I discloses a SQUID chip 72 and a SQUID sensor 70 sandwiched together and disposed at the end of a thermally conductive substrate 56. (See FIGS. 1, 2 and 4a, and Col.5, lines 62-64.) Wellstood I only discloses a SQUID chip consisting of a 200 nm-thick layer of  $\text{YBa}^2\text{Cu}_3\text{O}_7$  deposited on a 500  $\mu\text{M}$  thick, 10mm by 10mm  $\text{SrTiO}_3$  24 degree bicrystal substrate.

The Applicants claim “a radiation shield mounted within the dewar.” As noted in the Office Action, Wellstood I does not disclose, nor suggest, a “shield.”

Wellstood II discloses a system and a method for detecting electric field variations using a Single Electron Transistor (SET). (See abstract.) The Wellstood II device allows cooling of the SET to operate in the 3 to 10 degree K temperature range. (See Col. 4, line 51.) The Wellstood II device incorporates a heat shield surrounding a cold finger. (See FIG. 2.)

Applicant claims “mounting the sensor remotely from the coil.” On the other hand, Wellstood II discloses a scanning device using a SET mounted on a cold finger.

Wellstood II clearly teaches away combining these disclosures by stating that detection using an SET combined with a SQUID fails. In the Wellstood II patent it is stated that “a fairly exotic technique such as ... (SQUID) –based magnetic microscopy also fails because it depends on current flow” (See Col. 2, lines 12-15). Thus, there would be no motivation to combine the SQUID device of Wellstood I with the SET having a heat shield as disclosed in Wellstood II.

The Wellstood I disclosure teaches that the SQUID chip must be cooled to 77 degrees K (see Col. 4, lines 30-34). Wellstood I does not suggest cooling to temperatures below 77 degrees K, such as 3 to 10 degree K temperature range as suggested by Wellstood II. (See Col. 4, line 51.) Thus, since Wellstood I does not

require cooler temperatures below 77 degrees K, there would be no motivation to combine Wellstood I with a disclosure such as Wellstood II that provides for lower temperature operations.

Even if the Wellstood I and Wellstood II disclosures were somehow combined, they would not yield the Applicants' claimed approach since the Applicants claim "the extension reducing circular currents in the plane of the detection coil." Wellstood II does not teach, nor suggest, "preventing or reducing circular currents in the plane of the detection coil." Wellstood II only teaches the use of a SET. Since Wellstood II teaches the use of a SET (a transistor), circular currents are not a problem. Thus, there is no suggestion, nor teaching in either Wellstood I or Wellstood II to use an extension which "prevents or reduces circular currents in the plane of the detection coil."

For the foregoing reasons, amended independent claims 1 and 19 and amended dependent claims 2, 3 and 6 patentably distinguish over Wellstood I, either taken alone, or in combination with Wellstood II, or other cited art of record.

Claims 8 and 10 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Wellstood I in view of Wellstood II as applied to claims 1 and 7, and further in view of Wellstood III. Claims 8 and 10 are patentable along with their independent claim 1 as amended for the same reasons as mentioned above in connection with the discussion of claim 1 as amended. Therefore, claims 8 and 10 patentably distinguish over the cited references.

Claim 9 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Wellstood I in view of Wellstood II and Wellstood III as applied to claims 1, 7 and 8, and further in view of Sapir. Claim 9 is patentable along with its independent claim 1 for the same reasons as mentioned above in connection with the discussion of claim 1 as amended. Therefore, claim 9 patentably distinguishes over the cited art of record.

Claims 13, 14 and 18 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Wellstood I in view of Wellstood II as applied to claim 1 above, and further in view of Marooka. Claims 13, 14 and 18 are dependent ultimately from claim 1, and thus claims 13, 14 and 18 are patentable for the same reasons as mentioned above in connection with the discussion of claim 1. Therefore, claims 13, 14 and 18 patentably distinguish over the cited art of record.

Claim 15 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Wellstood I in view of Wellstood II as applied to claim 1, and further in view of Wikswo. Claim 15 depends ultimately from claim 1, and thus claim 15 is patentable along with claim 1 for the same reasons as mentioned above in connection with the discussion of claim 1 as amended. Therefore, claim 15 patentably distinguishes over the cited art of record.

Claim 16 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Wellstood I in view of Wellstood II as applied to claim 1, and further in view of Tsukada. Claim 16 ultimately depends from claim 1, and therefore claim 16 is patentable along with claim 1 for the same reasons as mentioned above in connection with the discussion of claim 1 as amended. Therefore, claim 16 patentably distinguishes over the cited art of record.

Furthermore, all of the patents cited in the last Office Action have been reviewed, and it is believed that the claims patentably distinguish thereover.


Please direct all correspondence to the undersigned attorney or agent at the address indicated below.

Respectfully submitted,

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**AMENDMENTS TO THE DRAWINGS:**

The attached drawing sheets include changes to Figure 1 and Figure 5. These sheets replace their respective original sheets. In Figure 1, previously omitted reference character 52 has been added, and in Figure 2, previously omitted reference character 87 has been added.

Attachments: Replacement sheet for Figure 1

Annotated sheet showing changes for Figure 1

Replacement sheet for Figure 5

Annotated sheet showing changes for Figure 5



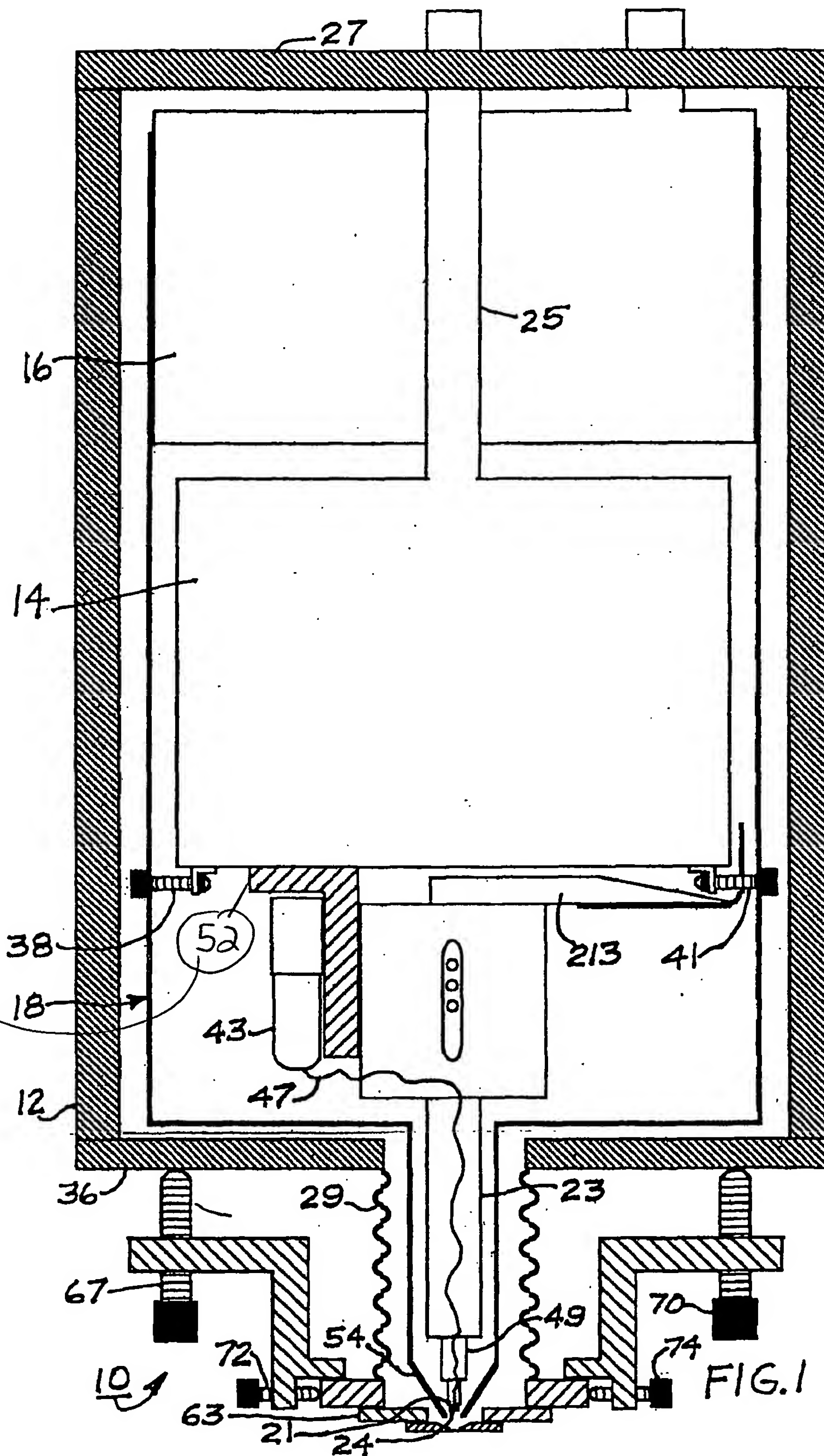
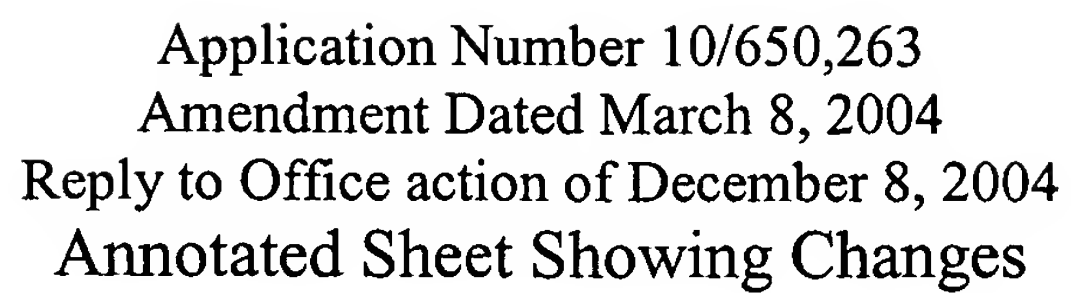
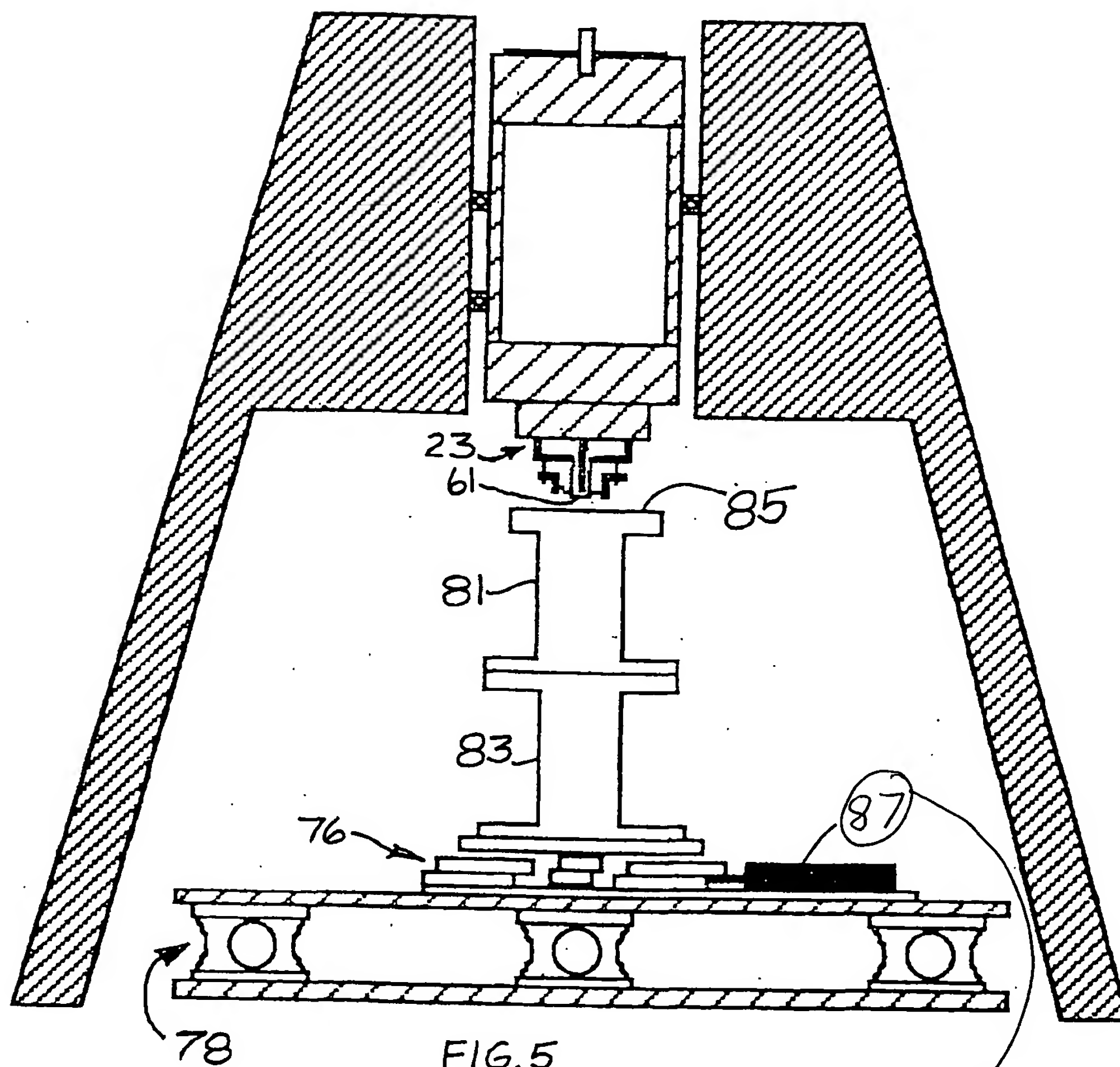


FIG. 1



Application Number 10/650,263  
Amendment Dated March 8, 2004  
Reply to Office action of December 8, 2004  
Annotated Sheet Showing Changes



Element 87  
added to the  
drawings.